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The Role of the HEART score and Clinical Decision Units in ED Patients with Chest Pain

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Abstract

Every year, millions of patients present to Emergency Departments across the country complaining of chest pain. Even after traditional ED testing which includes electrocardiograms, laboratory testing, and chest radiography, chest pain patients still have a small but real risk of serious illness. The HEART score is a new tool that has been validated to help risk-stratify patients. Clinical Decision Units decrease cost and length of stay without compromising patient safety, allowing for complete evaluations of these patients.

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Executive Summary

Chest pain is one of the most common complaints for patients presenting to emergency departments (ED). Many patients have serious causes for their symptoms such as acute myocardial infarction, pulmonary embolism, and aortic dissection, all which require immediate treatment. However, many chest pain patients have a benign etiology for their symptoms, and even after thorough ED evaluation, some patient still are at risk for serious causes for their symptoms. In recent years, the HEART score has emerged as a better way to risk-stratify ED chest patients. In addition, the implementation of Clinical Decision Units (CDUs) in some EDs and hospitals has shown potential for reducing the cost and time burden associated with these patients without sacrificing safety. While CDUs offer a promising solution, Medicare reimbursements may shift more of the cost onto patients; changes in Medicare reimbursements need to be adopted to ensure CDUs can continue benefiting patients.

Epidemiology of Chest Pain Patients

Chest pain is the chief complaint of nearly 5% of all patients who present to EDs. It accounts for 7 million visits and 2.5 million hospitalizations, with an estimated cost between $10-12 billion annually[1]. It is the most common reason for ED visit in patients over 65[2]. However, evidence of ischemia on EKG is present in only slightly more than a quarter of these patients and a final diagnosis of coronary artery disease is made in less than 20%[3]. The vast majority of chest pain patients have non-cardiac causes for their symptoms.

Challenges

One diagnostic challenge frequently encountered in the ED is chest pain with a non-diagnostic electrocardiogram (ECG). The difficulty lies in identifying the patients with truly life-threatening acute coronary syndromes, while avoiding potentially unnecessary and costly evaluations of the others. It has been estimated that 60-70% of chest pain patients are admitted to the hospital. However, the risk of missing acute myocardial infarctions (AMI) is ever present. It is estimated that approximately 2% of AMI patients are erroneously discharged from EDs[4]. Discharges of AMI patients are a major source of malpractice claims. On average, malpractice plaintiffs in missed AMI claims results in payments of over $120,000 and settlements are the largest category of monetary loss in emergency medicine[5,6].

In chest pain patients with non-diagnostic ECGs, the challenge is to achieve accurate diagnosis of possible AMI while reducing unnecessary hospital admissions. Two tools that can be helpful in helping make these decisions are the HEART score and the use of short-stay Clinical Decision Units (CDUs).

HEART score

Risk stratification algorithms such as the TIMI Score and the GRACE Score focus on identifying patients at high risk for having a major adverse cardiac event (MACE). These risk stratification tools help identify patients experiencing cardiac events even offer management guidelines for these patients. Yet neither the GRACE nor the TIMI score give much assistance with low risk chest pain patients. Fortunately, there is now a risk stratification tool specifically designed for low risk chest pain patients: the HEART score.

The HEART score is a risk stratification tool specifically designed for identifying patients at low risk for MACE. Identifying these patients as low risk is important as it can reduce unnecessary testing. The HEART score has five components: History suspicious for ACS, ECG abnormalities, Age, Risk factors for coronary artery disease, and Troponin levels. Each category is scored from 0 to 2 depending on the response. The calculated score gives the chance that the patient will experience an MI, PCI, CABG, or death up to 6 weeks after his or her presentation. Any patient with a score of 0-3 has a less than 2% chance of having an MACE six weeks and can be considered safe for early discharge. Since it was introduced, the HEART score has been validated in multiple studies[7,8]. More recently, one study compared the HEART score against the TIMI and GRACE scores. It found that the HEART score outperformed both the TIMI and GRACE score in determining which patients are having an MACE and also in determining which patients were truly low risk[9]. With the HEART score, physicians can make more informed decisions about which patients are low risk and can be safely discharged.

Clinical Decision/Observation Units

Another way to distinguish between cardiac and non-cardiac etiologies for chest pain consists of observation along with serial serum troponin levels and ECGs. Clinical Decision Units (CDUs) are short-stay units within the ED that allow for patients to be observed and evaluated in a controlled setting. Chest pain patients typically stay in the CDU for 15-18 hours[10]. During this time, a CDU protocol aimed at determining the patient's risk for cardiac chest pain is followed. If warranted, provocative testing and hospital admission are available. Ultimately, approximately 85% of CDU patients are safely discharged home, resulting in a 14% decrease in inpatient admission rates[11]. Nearly 1/3 of hospitals currently have dedicated CDU's[12].

CDU protocols include cardiac monitoring with serial ECGs as well as serum biomarker testing and provocative testing where indicated. Examples of provocative testing include exercise ECG testing, nuclear medicine scans, exercise stress echocardiography, coronary computed tomographic angiography and cardiac magnetic resonance imaging scans.

The creation of dedicated CDUs, coupled with CDU protocols and provocative testing, has led to better risk stratification algorithms. Risk stratification tools have allowed for more targeted decision making, including whether the patient can be safely discharged from the CDU after serial negative serum troponin measurements. Further refinement of CDU admissions criteria may improve effectiveness of

the CDU. For example, a particularly important risk factor for AMI is age. The prevalence of AMI in patients under 40 years of age is approximately 1%. The utility of routine observation and cardiac testing in patients under 40, who otherwise have low risk factors for CAD, has recently come into question[13]. It is possible that CDU observation in patients under 40 years of age, with no other cardiac risk factors, may not be necessary. Prospective enhanced risk stratification for CDU admission may improve the overall therapeutic yield and minimize false positive results.

When compared to the traditional inpatient units, CDUs serve as a more cost effective alternative. The average cost for a CDU stay is $1,528 versus a typical inpatient stay costing $2,095[14]. This cost savings is also aligned with the shorter length of stay (LOS) in a CDU when compared to the typical inpatient admission. In addition, at many centers CDUs have a higher patient satisfaction score compared to inpatient stays[15].

Medicare Reimbursements for CDU's

Medicare audits chest pain admissions for overpayments. Most have been triggered secondary to short lengths of stay for inpatient admissions. This is particularly common at institutions that have no CDU, because they have no option for a short stay without hospital admission. The number of Medicare patients in CDUs has increased by 88% in the past 6 years[16]. These admissions have been classified as outpatient care by Medicare. By definition, these patients must be observed for a minimum of 8 hours to qualify for reimbursement and are covered under Medicare Outpatient Prospective Payment System (OPPS). Under OPPS, patients pay the Medicare deductible, a copay for every service, and out of pocket for services not covered[17]. Ambulatory Payment Classifications (APC's) are the government's method of paying facilities for outpatient services for the Medicare program. APC payments are only made to hospitals when the Medicare outpatient is discharged from the ED or clinic or is transferred to another facility. Each APC is composed of services which are similar in clinical intensity, resource utilization, and cost. These APCs are under the broader CMS Hospital Healthcare Common Procedure Coding System (HCPCS). All services are grouped under a specific APC and result in a "prospective payment" for that particular APC. Since this payment is a prospective and a "fixed" payment to the hospital, the hospital is at risk for potential "profit or loss" with each APC payment it receives. APC's were created to transfer some of the financial risk for outpatient services from CMS to the individual hospitals.

Previously, the HCPCS had 3 APC codes for CDU services: APC 610 ($66), APC 611 ($105) and APC 612 ($158). These codes only cover staff and unit space costs. All other tests performed are reimbursed under different APC's. However, in 2016, the Centers for Medicare and Medicaid introduced C-APC 8011 with the "C" standing for "comprehensive". C-APC 8011 provides a bundled payment of $2,174 to hospitals for observational care. This payment is meant to cover all aspects of the patient's stay in the CDU, including tests run and drugs administered. According to ACEP Now, "This major change to bundled facility payments will provide incentives to hospitals to minimize diagnostics and lengths of stay, which favors protocol-driven care and early discharge-features of most emergency medicine-run observation units."[18]

Shortcomings/Areas for Improvement

Although CDUs are more cost effective from the CMS perspective, cost to the actual Medicare patient is often higher than a typical inpatient stay. Inpatient stays are capped for this patient population at $1,156. In contrast, a CDU stay classified as outpatient, results in a copay for every service rendered, and any drugs which may be administered are not covered. Under this APC model of reimbursement, hospitals are also losing money. A recent JAMA study summarized: "The cost for observation care was less than the cost of inpatient care, but reimbursement was markedly lower, resulting in operating losses and the transfer of some costs to the patient."[19] In reality, the patient is expected to cover more of the cost. This is particularly challenging given that nearly 50% of the Medicare patient population has an income level <200% below federal poverty level and cannot therefore cover the costs incurred[20].

Conclusions and Recommendations

1. Chest pain patients represent a significant portion of ED patients. The vast majority of these patients have do not have serious causes for their symptoms.
2. The HEART score provides a risk stratification tool specifically for low risk chest pain patients. It can be used to reliably determine which patients can be safely discharged from the ED.
3. Efforts to make the process of ruling out AMI in chest pain patients more efficient, without decreasing patient safety, would result in considerable decreases in cost.
4. Clinical Decision Units (CDUs) have shown promise as a way to more efficiently manage ED chest pain patients. CDUs offer an efficient and cost-effective way to manage patients with chest pain. CDUs are effective in limiting unnecessary hospital admissions and containing health care costs, while also providing an appropriate setting for diagnosis and management of patients at risk for acute coronary syndrome.
5. Medicare has taken an important step by changing their reimbursement for observation care to a bundled payment. This will incentivize hospitals to reduce unnecessary diagnostic testing and decrease length of stay.
6. Continuing to classify observation care as an outpatient procedure means that patients pay a copay for every service rendered and drug administered. Since many Medicare patients fall below the federal poverty line, these additional costs may be prohibitively expensive. Medicare should consider altering their classification of observation care so that costs are not a barrier for patients receiving this necessary care.

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